THE EFFECT OF TQM IMPLEMENTATION AND PRODUCTION EFFECTIVENESS ON SKINTIFIC SKINCARE CUSTOMER SATISFACTION IN MEDAN CITY

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Abstract

This study aims to determine the influence of Total Quality Management (TQM) and production effectiveness on Skintific customer satisfaction in Medan City. The method used was quantitative associative with 75 Gen Z respondents. The results showed that TQM and production effectiveness had a significant effect both partially and simultaneously on customer satisfaction, with t-calculated values of 8.383 and 6.145 respectively (t table = 1.66071), and F calculated as 51.594 (F table = 3.12). The Adjusted R^2 value of 0.578 shows the contribution of the two variables of 57.8% to customer satisfaction. In conclusion, improving overall quality and efficient production processes can increase customer satisfaction in the skincare industry.

Keywords: Total Quality Management, production effectiveness, customer satisfaction, Skintific, Gen Z

INTRODUCTION

The cosmetics and skincare industry in Indonesia has shown a tremendous surge in growth in recent years. According to data from the Food and Drug Regulatory Agency ((BPOM), 2023), the number of cosmetic companies increased from 819 in 2017 to more than 1,200 in 2023. One of the brands that has experienced rapid growth is Skintific, which stands out thanks to its science-based approach, the safety of its ingredient composition, and the effectiveness of its products. In the city of Medan, Skintific has become one of the favorite brands, especially among the millennial generation and Gen Z who are increasingly selective in choosing skin care products. In this condition, companies are required to maintain product quality and provide consistent service to their consumers.

To deal with the ever-changing market dynamics, companies are required to implement a managerial strategy that focuses on improving quality across the board. One of the approaches that is widely adopted is Total Quality Management (TQM). (Goetsch & Davis, 2014) defines TQM as a management strategy that focuses on continuous improvement, active participation of all organizational elements, and a strong orientation towards customer satisfaction. Meanwhile, (Deming, 1986) emphasizing that quality must be instilled in every stage of the production and service process, not only judged by the final result. In the skincare industry, the application of TQM principles is believed to be able to build consumer trust in brands through quality assurance, continuous innovation, and consistent service.

Although quality management plays an important role, product quality is also greatly influenced by the effectiveness of the production process. Effective production is able to produce products in quantities and times that match market demand without disregarding quality standards. (Popa et al., 2025) states that production effectiveness includes efficiency in the work process, optimization of the use of resources, and continuous quality control. Meanwhile, (Hariyani et al., 2025) emphasizing that the smooth production process directly impacts product availability

and customer satisfaction levels. In the field, there are still many complaints from consumers related to distribution delays, quality inconsistencies, and stock instability which reflects the need to improve production and quality management.

Based on the above background description, the formulation of the problem in this study is: (1) Does the implementation of Total Quality Management affect the satisfaction of Skintific customers in Medan City? (2) Does production effectiveness affect customer satisfaction? (3) How much influence do the two variables have on customer satisfaction together? The purpose of this study is to examine and analyze the influence of Total Quality Management and production effectiveness both partially and simultaneously on the level of Skintific customer satisfaction in Medan City. The findings of this study are expected to provide theoretical and practical benefits in supporting the development of quality management strategies and production efficiency in the domestic skincare industry sector.

THEORETICAL STUDIES

Total Quality Management (TQM)

According to (Venom & Venom, 2023), Total Quality Management (TQM) is a comprehensive strategic approach within an organization to improve efficiency and effectiveness through a culture of continuous improvement, with an emphasis on customer satisfaction and employee engagement. TQM is considered a key factor in driving the improvement of operational quality as well as financial performance. Meanwhile, (Cheirkhanova et al., 2025) emphasizing that modern TQM should be customer-focused, integrated with satisfaction and financial indicators, and tailored to the characteristics of each industry. A comprehensive quality management approach has been proven to increase the level of profits and customer loyalty.

(Alawag et al., 2024) proposes five key indicators of TQM that are relevant to modern enterprises:
1. Customer focus
2. Leadership and top management commitment
3. Employee involvement and training
4. Continuous improvement (Kaizen)
5. Measurement, analysis, and process management

Production Effectiveness

(Psarommatis & May, 2024) argues that production effectiveness is not only seen from the ratio of efficiency between output and input, but also includes the speed of the production process, waste reduction, and the ability of the system to adapt to changing demand. Meanwhile, (Sotirelis & Grigoroudis, 2021) added that in the framework of TQM, production effectiveness is closely related to the acceleration of innovation, consistency of production results, and the use of technology for quality control.

(Liu et al., 2024) develop production effectiveness indicators in the Quality 4.0 framework as follows:
1. Production output (kuantitas)
2. Process speed
3. Resource utilization

4. Quality compliance
5. Production adaptability

Customer Satisfaction

(Alsaqer et al., 2024) It states that customer satisfaction is the result of a comprehensive experience that reflects the perception of value, service quality, and ease of interacting with the company. Meanwhile, (Njonge, 2023) emphasizing that customer satisfaction reflects a form of loyalty that is based on the perception of service reliability, empathy, and relationship quality built by organizations, especially in the retail and service sectors.

(Silva & Pinto, 2023) adapting the SERVQUAL model into five key indicators to assess today's customer satisfaction:
1. Tangibles (physical appearance of products & packaging)
2. Reliability (reliability of services & products)
3. Responsiveness (speed and responsiveness)
4. Assurance
5. Empathy (individualized attention to customers)

In today's cosmetics industry, such as Skincare Skintific, customer satisfaction is the main benchmark of a company's success because it has a direct impact on consumer loyalty, brand image, and business development. Two aspects that are very influential in achieving this satisfaction are Total Quality Management (TQM) and production effectiveness. TQM plays a role in creating a comprehensive quality culture across all company lines, including product quality, work processes, services, and the involvement of all parties in the organization (Goetsch & Davis, 2014). Meanwhile, production effectiveness focuses on the efficient use of resources, waste reduction, and precision in meeting market needs, which according to (Heizer & Render, 2017), has a significant impact on service quality and customer satisfaction levels. Therefore, this study aims to examine the influence of TQM (X_1) and production effectiveness (X_2) on customer satisfaction (Y) of Skintific in Medan City, as shown in the following conceptual framework:
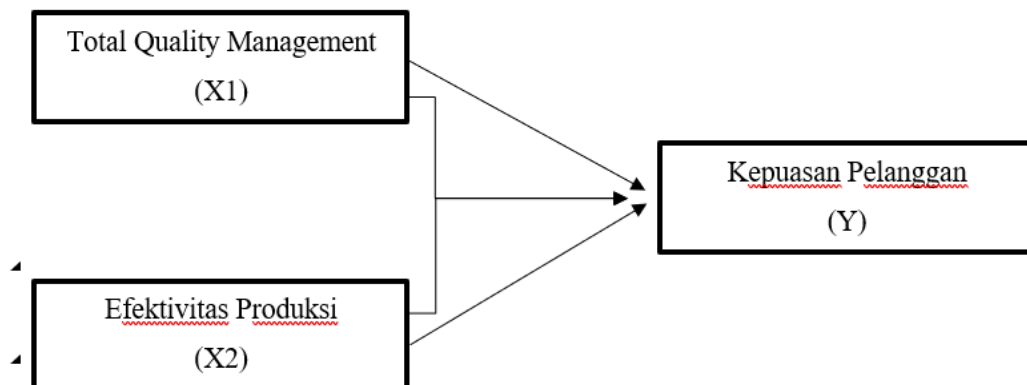

Figure 1. Conceptual Framework

RESEARCH METHODS

This study uses a quantitative method with an associative approach to test the influence of Total Quality Management (TQM) and production effectiveness on customer satisfaction. The data

was analyzed using SPSS version 26. The study population is Gen Z consumers who use Skintific who work and live in Medan City. Since the population number is not known for sure, the determination of the sample refers to the formula (Hair et al., 2010), which is 5 times the number of indicators, so that 75 respondents were obtained. The sampling technique used is accidental sampling with the following criteria: age 17-26 years, domiciled and working in Medan, and having used Skintific products for at least 3 months. The instrument was developed in the form of a closed-ended questionnaire on the Likert scale, and tested through validity tests (Pearson's correlation) and reliability (Cronbach's Alpha). Classical assumption tests include normality, multicollinearity, and heteroscedasticity. Data analysis was carried out by multiple linear regression, equipped with t-test (partial), F-test (simultaneous), and coefficient of determination (R^2) to assess the contribution of independent variables to customer satisfaction.

RESULTS AND DISCUSSION

Normality Test Results

Table 1. Normality Test Results

One-Sample Kolmogorov-Smirnov Test		
		Unstandardized Residual
N		75
Normal Parametersa,b	Mean	,0000000
	Hours of deviation	1,57587698
Most Extreme Differences	Absolute	,086
	Positive	,059
	Negative	-,086
Test Statistic		,086
Asymp. Sig. (2-tailed)		,200c,d
a. Test distribution is Normal.		
b. Calculated from data.		
c. Lilliefors Significance Correction.		
d. This is a lower bound of the true significance.		

Source:SPSS Version 25

The table above shows the results of the normality test using the *One-Sample Kolmogorov-Smirnov Test* method on residual data that has not been standardized. With a total of 75 samples, a *Test Statistic* value of 0.086 and *Asymp were obtained. Sig.* (*2-tailed*) by 0.200. Since the significance value is greater than 0.05, it can be concluded that the residual data is normally distributed.

Multicollinearity Test Results

Table 2. Multicollinearity Test Results

Coefficientsa			
		Collinearity Statistics	
Model		Tolerance	BRIGHT
1	(Constant)		

	Total Quality Management	,998	1,002
	Production Effectiveness	,998	1,002
a. Dependent Variable: abs_RES			

Source:SPSS Version 25

The table above presents the results of the multicollinearity test on the variables that influence the customer's decision. All *Tolerance* values are above 0.1 and VIF values are below 10, which is for Total Quality Management (*Tolerance* 0.998; VIF 1.002) and production effectiveness (*Tolerance* 0.998; VIF 1,002). This indicates that there are no significant symptoms of multicollinearity among independent variables, so the regression model is feasible to use.

Heteroscedasticity Test Results

Table 3. Heteroscedasticity Test
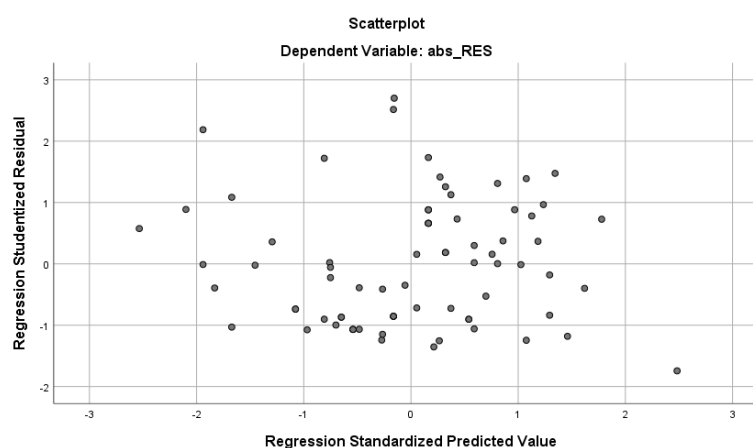
Source:SPSS Version 25

The scatterplot shows the absence of symptoms of heteroscedasticity, so the homocedasticity assumption is fulfilled and the regression model is feasible for the t-test, the F-test, and the coefficient of determination (R^2).

Multiple Linear Regression Analysis Results

The results of multiple linear regression testing in this study are presented in Table 8 below.

Table 4. Multiple Linear Regression Analysis

Coefficientsa			
		Unstandardized Coefficients	
Model		B	Std. Error
1	(Constant)	-3,191	1,961

Total Quality Management	,600	,072
Production Effectiveness	,489	,080
a. Dependent Variable: customer satisfaction		

Source:SPSS Version 25

$$Y = -3.191 + 0.600X_1 + 0.489X_2$$

a. A constant value of -3.191 indicates that if Total Quality Management (X_1) and production effectiveness (X_2) have not changed or are in a constant state, then customer satisfaction is estimated to be at -3.191. However, this negative number does not represent real conditions, but only the result of mathematical calculations from regression models.

b. A regression coefficient of 0.600 in the Total Quality Management variable indicates that an increase of one unit in the implementation of TQM will contribute to an increase in customer satisfaction of 0.600, noting that production effectiveness remains unchanged.

c. A coefficient value of 0.489 on the production effectiveness variable means that every one unit increase in production effectiveness is predicted to increase customer satisfaction by 0.489, as long as TQM is under the same conditions.

Results of the t-test (partial)

Table 5. Results of the t-test (partial)

Coefficientsa						
Model		Unstandardized Coefficients		Standardized Coefficients	t	Itself.
		B	Std. Error	Beta		
1	(Constant)	-3,191	1,961		-1,627	,108
	Total Quality Management	,600	,072	,634	8,383	,000
	Production Effectiveness	,489	,080	,465	6,145	,000
a. Dependent Variable: customer satisfaction						

Source:SPSS Version 25

The calculated t value for Total Quality Management is 8.383 and for Production Effectiveness is 6.145, while the table t is 1.66071 (n–k = 75–2–1). Because $t_{counts} > t_{table}$, and the significance value < 0.05, both have a significant effect on Customer Satisfaction.

F Test Results

Table 6. F Test Results

ANOVA						
Model		Sum of Squares	df	Mean Square	F	Itself.
1	Regression	263,376	2	131,688	51,594	,000b

Residual	183,771	72	2,552			
Total	447,147	74				
a. Dependent Variable: customer satisfaction						
b. Predictors: (Constant), production effectiveness, Total Quality Management						

Source:SPSS Version 25

The results of the F test showed that the calculated F value of 51.594 exceeded the $F_{of\ the\ table}$ by 3.12 (df1 = 2; df2 = 72), with a significance level of 0.000 that was smaller than 0.05. This indicates that Total Quality Management and Production Effectiveness together have a significant influence on Customer Satisfaction.

R2 (Coefficient of Determination) Test Results

Table 7. R2 (Coefficient of Determination) Test Results

Model Summaryb				
Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	,767a	,589	,578	1,59761
a. Predictors: (Constant), production effectiveness, Total Quality Management				
b. Dependent Variable: customer satisfaction				

Source:SPSS Version 25

The Model Summary table shows that the regression model used has a fairly strong predictive power in describing the influence of Total Quality Management and production effectiveness on customer satisfaction. This is shown by the R value of 0.767, which according to Sugiyono (2017) reflects a high correlation between the free variable and the bound variable. Meanwhile, Square's Adjusted R value of 0.578 indicates that 57.8% of the change in customer satisfaction can be explained by these two variables, while the rest is influenced by other factors outside of the research model. Ghozali (2018) stated that the closer it is to the value of 1, the Adjusted R Square reflects the better the model's ability to explain the dependent variables. A Standard Error of the Estimate value of 1.59761 indicates an acceptable level of model prediction error, so this model is considered valid and relevant for use in research analysis.

DISCUSSION

The Influence of Total Quality Management on Customer Satisfaction (H1)

The results of the t test showed that the Total Quality Management variable had a positive and significant influence on customer satisfaction, with a t calculation of 8.383 > t table 1.66071 and a significance value of 0.000 < 0.05. This indicates that the higher the application of TQM principles, the higher the customer satisfaction. These findings support the theory (Goetsch & Davis, 2014) stating that TQM is a holistic approach that emphasizes continuous improvement, employee engagement, customer focus, and top management leadership. In the field, the implementation of TQM by Skintific reflects the company's efforts to maintain product quality consistency, response to customer feedback, and service improvement that has a direct impact on customers' positive perception of the brand. This is also in line with regression results which show that every 1 unit increase in TQM increases customer satisfaction by 0.600 points, assuming the other variables are constant.

The Effect of Production Effectiveness on Customer Satisfaction (H2)

The production effectiveness variable also showed a significant influence on customer satisfaction, with a t calculation of 6.145 > t table 1.66071 and a significance of 0.000. The value of the regression coefficient of 0.489 indicates that effectiveness in production contributes positively to consumer perception. These findings support the theory (Heizer & Render, 2017) which emphasizes the importance of process efficiency, minimization of waste, and optimal use of resources to improve quality and satisfaction. On the ground, this is reflected in Skintipic's ability to maintain product availability, quality stability, and distribution speed, all of which are part of an effective production process. In the context of the skincare industry, production effectiveness not only plays a role in internal operations, but also has a direct impact on product availability in the market, consistency of results, and responsiveness to consumer trends, especially for Gen Z who are very responsive to quality and service issues.

The Simultaneous Effect of TQM and Production Effectiveness on Customer Satisfaction (H3)

Simultaneously, the results of the F test showed that Total Quality Management and Production Effectiveness together had a significant effect on Customer Satisfaction, with F calculated as 51.594 > F table 3.12, and significance value 0.000 < 0.05. These findings reinforce the theory (Venom & Venom, 2023) which states that the synergy between quality management systems and operational efficiency plays an important role in improving service performance and customer experience. In addition to TQM, production effectiveness has also been proven to have a crucial role in shaping positive customer perceptions. With a regression coefficient value of 0.489 and a significance of 0.000, this variable shows a positive and significant relationship to customer satisfaction. This indicates that an efficient, timely, and consistent production process in producing high-quality products will directly increase consumer satisfaction. In the skincare industry, where product quality and consistency are the main determinants, operational efficiency and the ability to respond to market dynamics are essential. Optimal production ensures product availability and stable quality standards, which in turn creates a positive experience for users.

CONCLUSIONS AND SUGGESTIONS

The results of the study show that Total Quality Management (TQM) and production effectiveness have a significant and positive influence on the satisfaction of Skintific customers in Medan City. The implementation of TQM through employee involvement, continuous quality improvement, and orientation to customer needs has been proven to be able to drive consumer satisfaction. Similarly, production effectiveness, which includes operational efficiency, stable product quality, and the ability to respond to market demand dynamics, also strengthens a positive perception of the brand. The regression analysis model shows that 57.8% of customer satisfaction variations can be explained by both variables. The advantage of this research lies in the application of contemporary theory and focus on the Gen Z segment, but limitations remain in the narrow scope of the area and the limited number of respondents. Therefore, future research is recommended to develop regional coverage as well as consider new variables such as product innovation, digital services, and price perception.

As a implication, Skintific's management needs to further optimize the principles of TQM, especially in terms of developing human resource competencies, supervising product quality, and improving the quality of service to customers. Efforts to increase production effectiveness also need to be focused on process efficiency, stability of production results, and flexibility in

the face of changing demand. These findings can be a strategic foundation for other skincare industry players in designing integration between quality management systems and production processes. For follow-up research, it is recommended to apply a mixed method approach and expand the population so that the results obtained are more comprehensive and representative of broader market conditions.

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